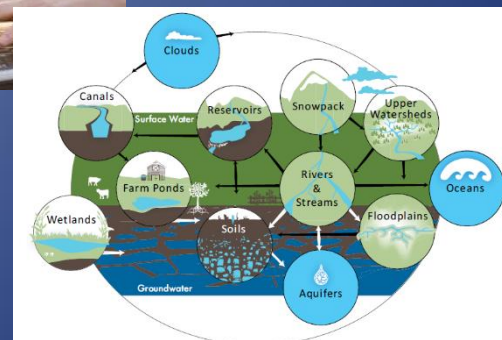
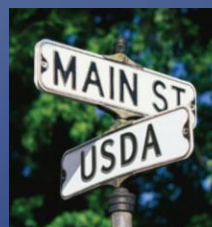
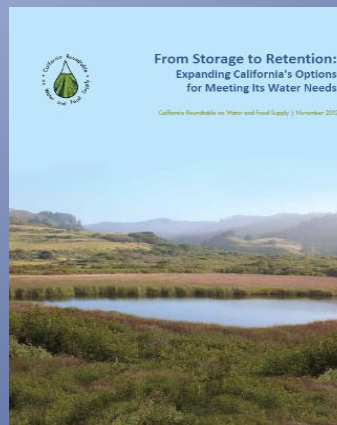


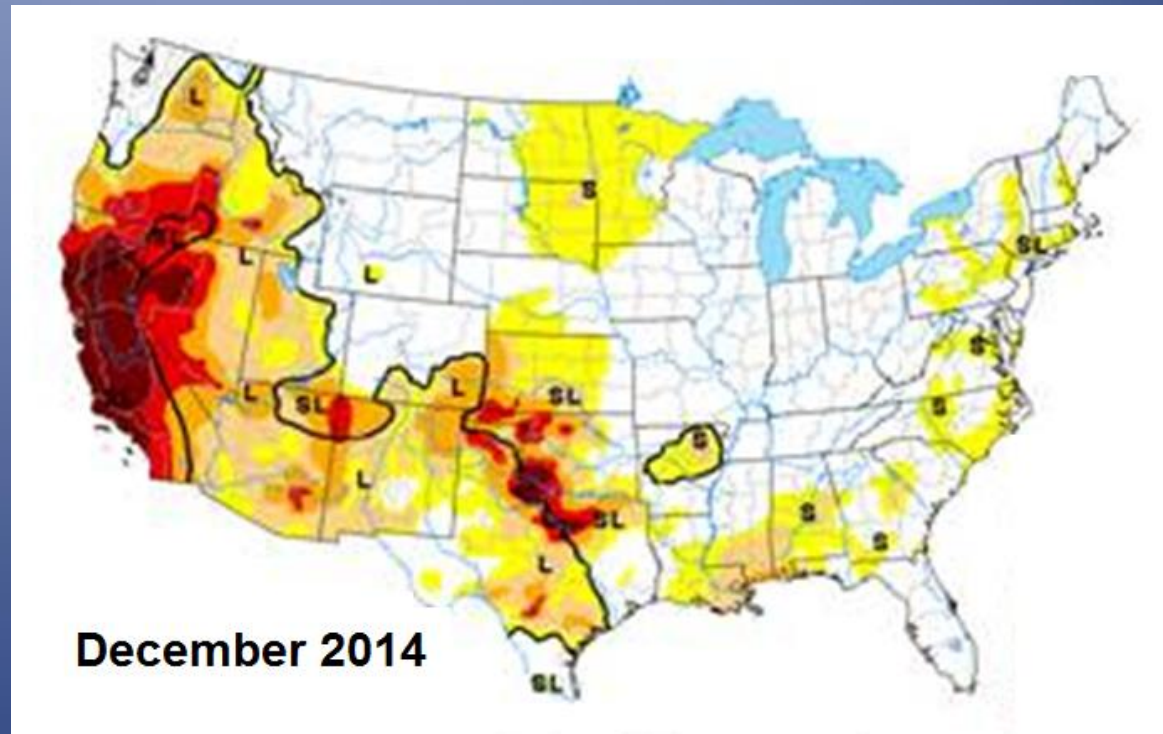
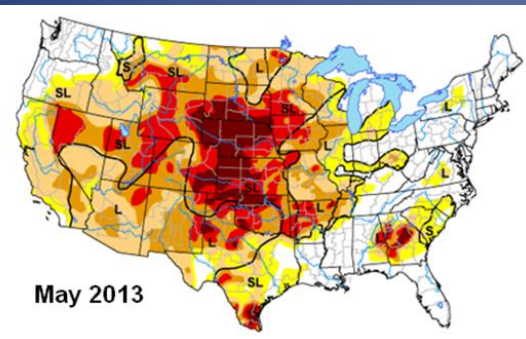
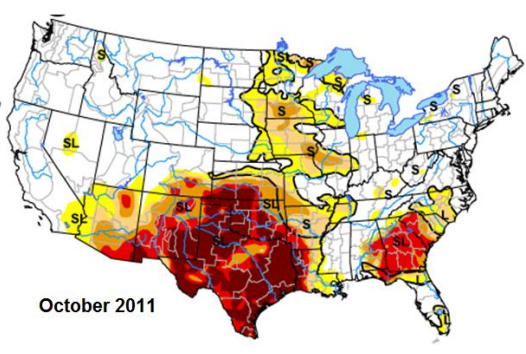
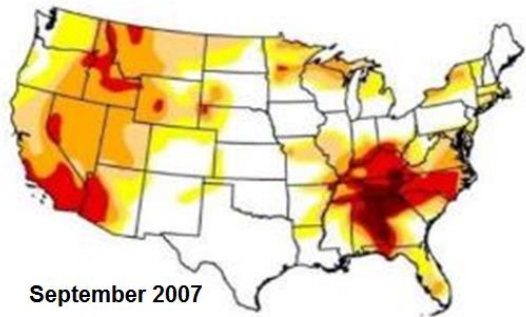
Fighting Scarcity: Innovation & Comprehensive Strategies to Address Our Water Challenges

Dr. Glenda Humiston
State Director, California
USDA Rural Development



Water Scarcity is a Growing Problem

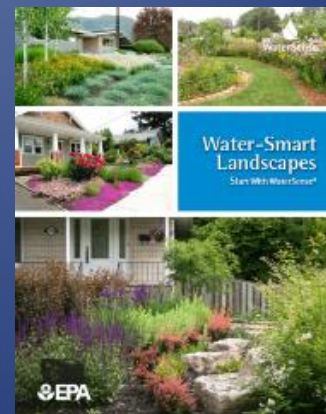
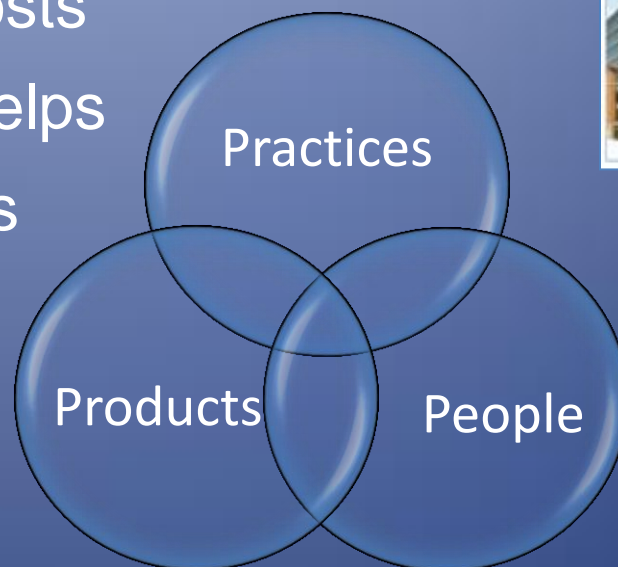
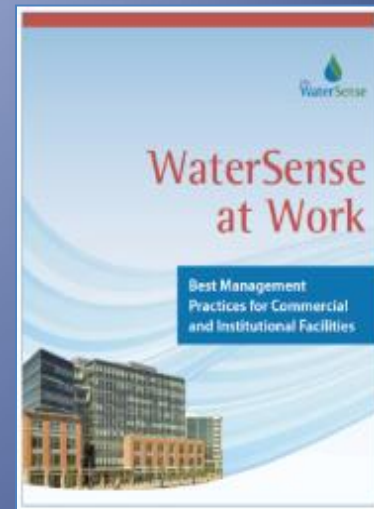
- Drought is somewhere every year
- Climate change only exacerbates problems and increases uncertainty



Saving Water Provides Multiple Benefits

- Water efficiency improves resilience to water shortages
- Water, sewer, and energy costs are rising; water efficiency helps reduce these operating costs
- Saving water saves energy

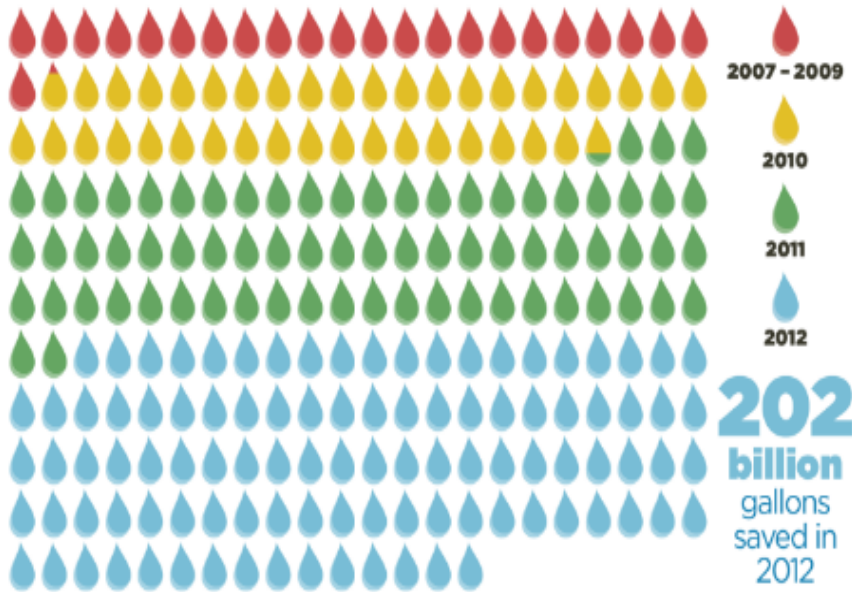
www.epa.gov/watersense



Savings Add Up Quickly!

2006 – 2012

487 billion gallons of water saved since 2006!



That's enough water to supply all the homes in **Colorado** and **Arizona** for a year!

WaterSense has helped **reduce** the amount of **energy needed** to heat, pump, and treat water by

64.7 billion

kilowatt hours, enough to supply a year's worth of power to more than



Saving consumers
\$8.9 Billion
In water and energy bills!

Pursuing Net-Zero Water Use for Ag

U.C. Davis: Jess Jackson Sustainable Winery Building

Showcasing “smart” technology that maximizes environmental capabilities of winery, brewery, and food-processing complex.

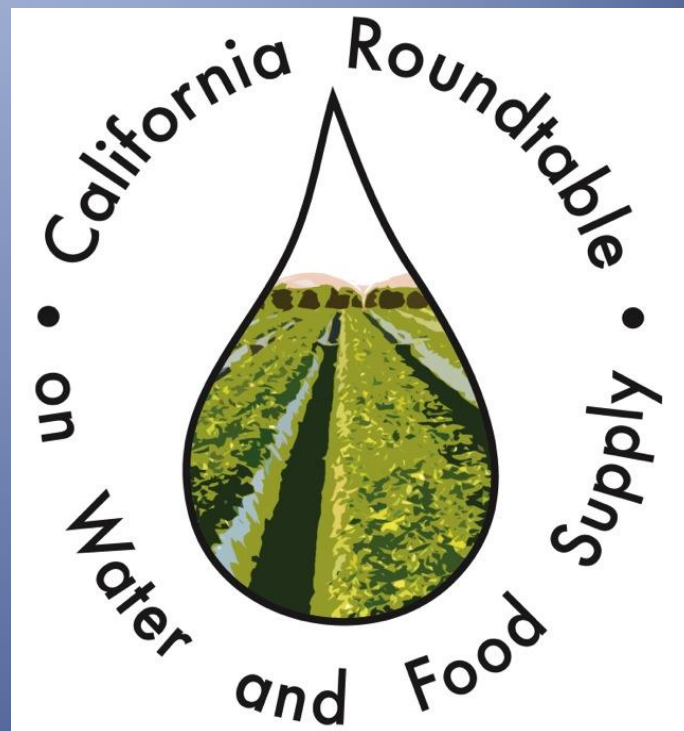
- ✓ Automated systems to clean equipment
- ✓ High-purity filtration of rainwater
- ✓ Off-peak processing, ...and more!



90% of water & chemicals from each cleaning cycle is captured and processed for future use in the complex, eventually being used as many as 10 times.

CA Roundtable on Water & Food Supply

- Launched in 2010
- Consensus-based process
- Diverse Stakeholders
- Objectives:
 - Build relationships between agriculture and other key stakeholders
 - Generate common principles and recommendations for decision-makers and the public

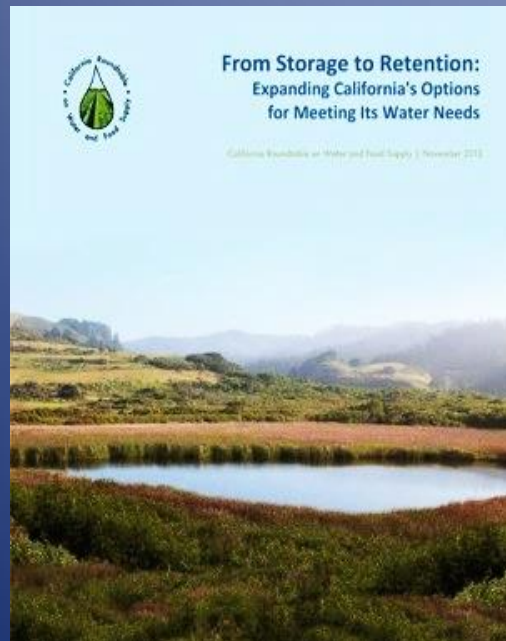
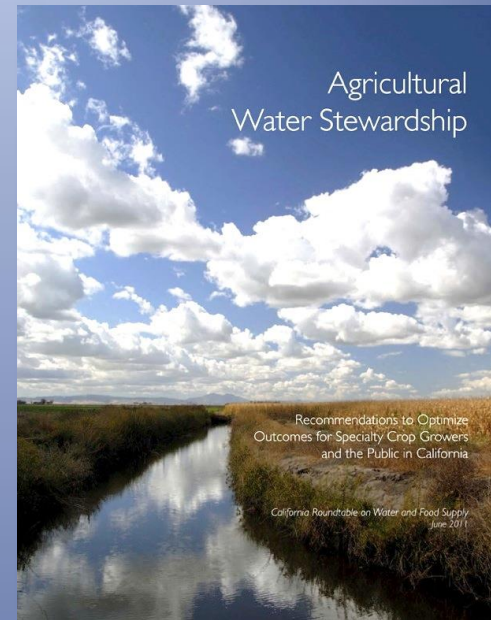


A project of Ag Innovations Network

www.aginnovations.org

Module 1: Ag Water Stewardship

Outlines an agricultural water stewardship framework – conservation & efficiency



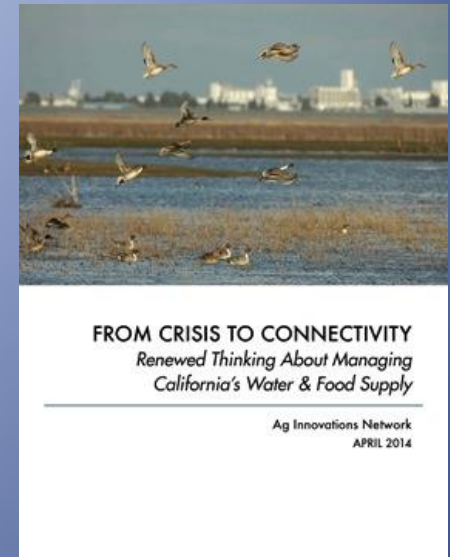
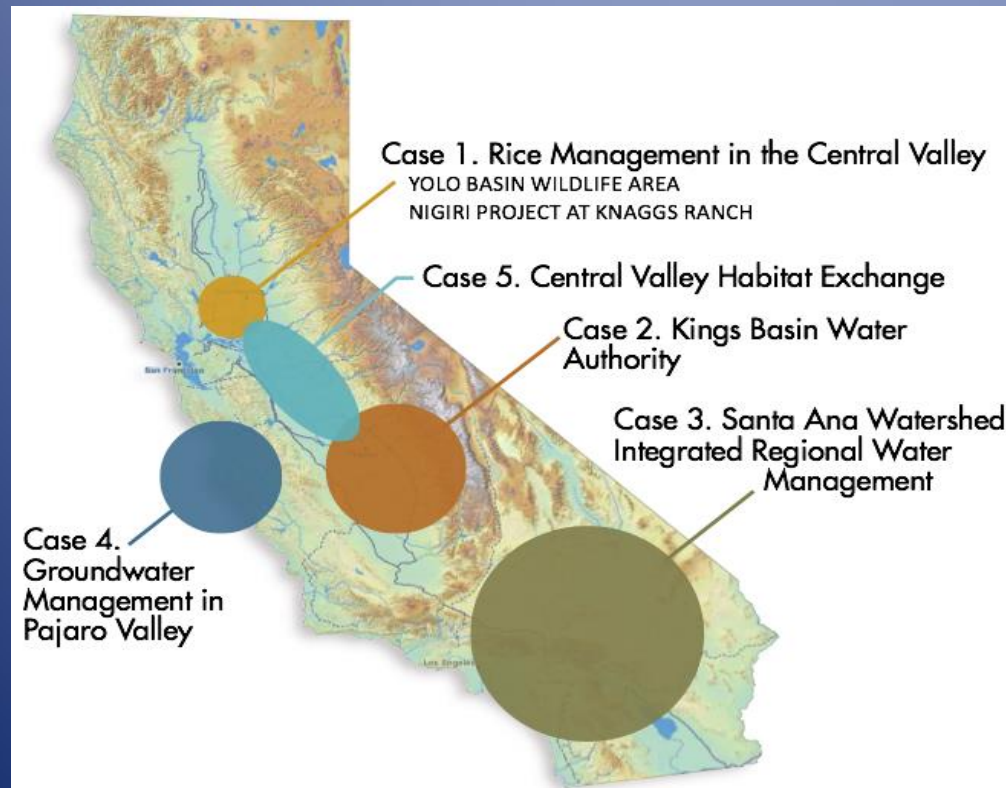
Module 2: From Storage to Retention

New approaches to storing water
– expanding options and site-specific parameters

Identifies priorities for action

Module 3: From Crisis to Connectivity

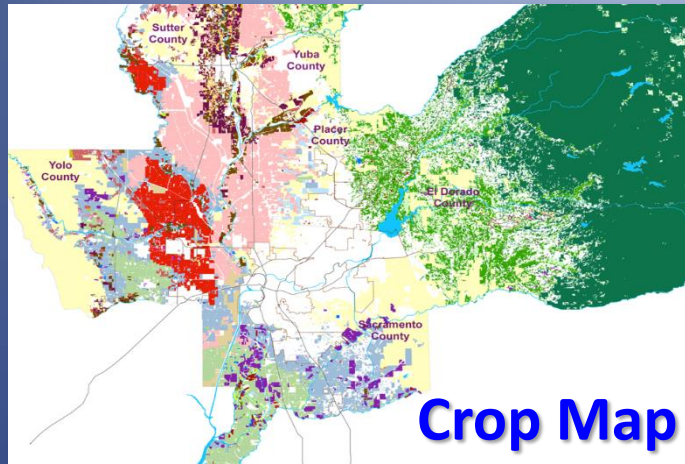
- Examines historical disconnections that have led to water crises in CA
- The connectivity approach offers a model for designing strategic and systemic solutions



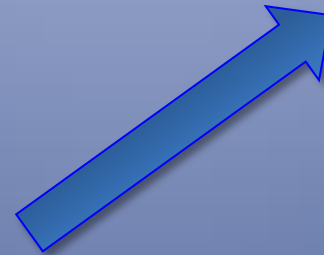
Offers guiding principles for implementing a resilient water infrastructure

Rural-Urban Connections Strategy

Sacramento Area Council of Governments • www.sacog.org/RUCS



Crop Map

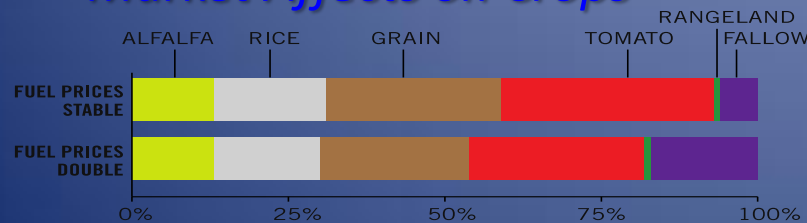


**RUCS
Scenario
Analysis
Tool**

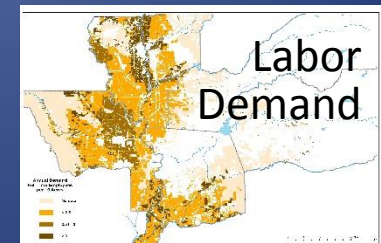
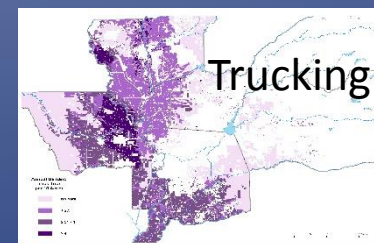
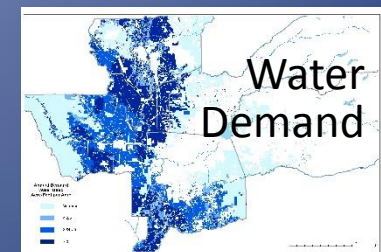
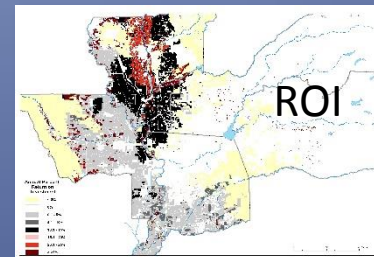


Modules Informing Scenarios

Market Affects on Crops



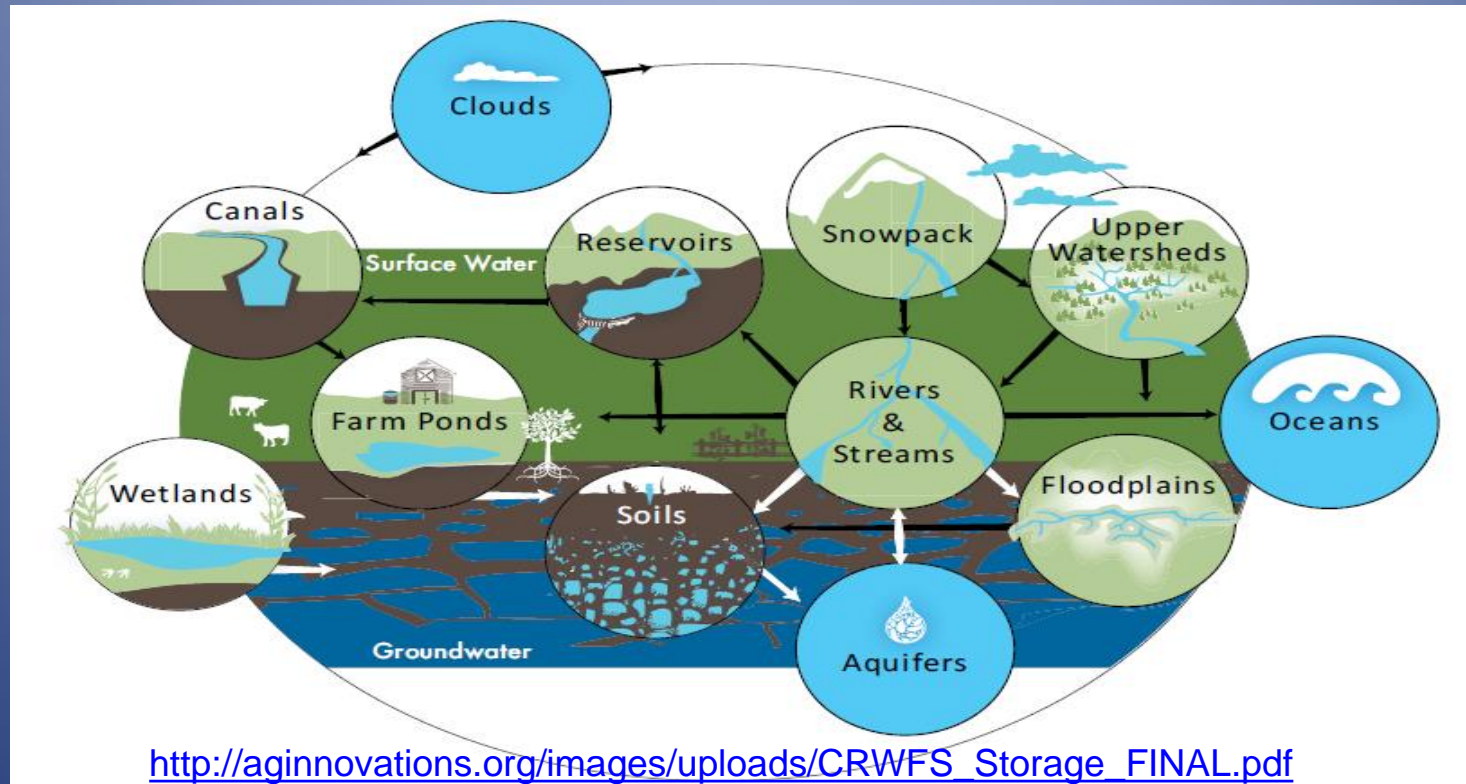
Local Market Food Production



Rural
Development

Committed to the future of rural communities

Understanding diverse “reservoirs” can bridge gaps in natural availability of water.



Healthy watersheds in the Sierra & Cascade Ranges can produce 9 – 16% more water.

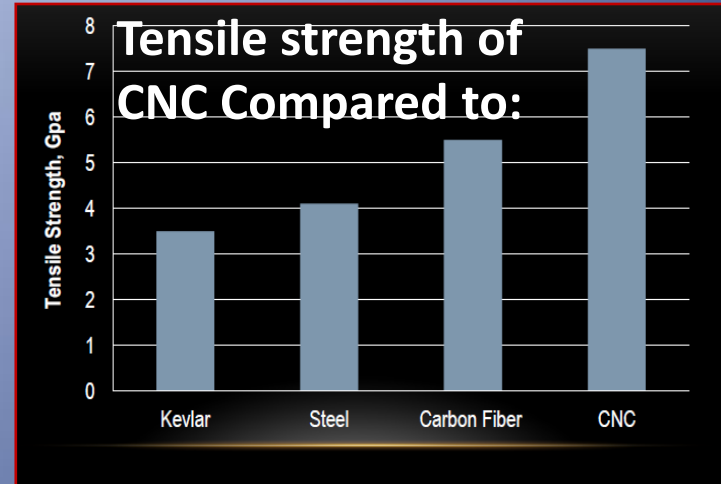
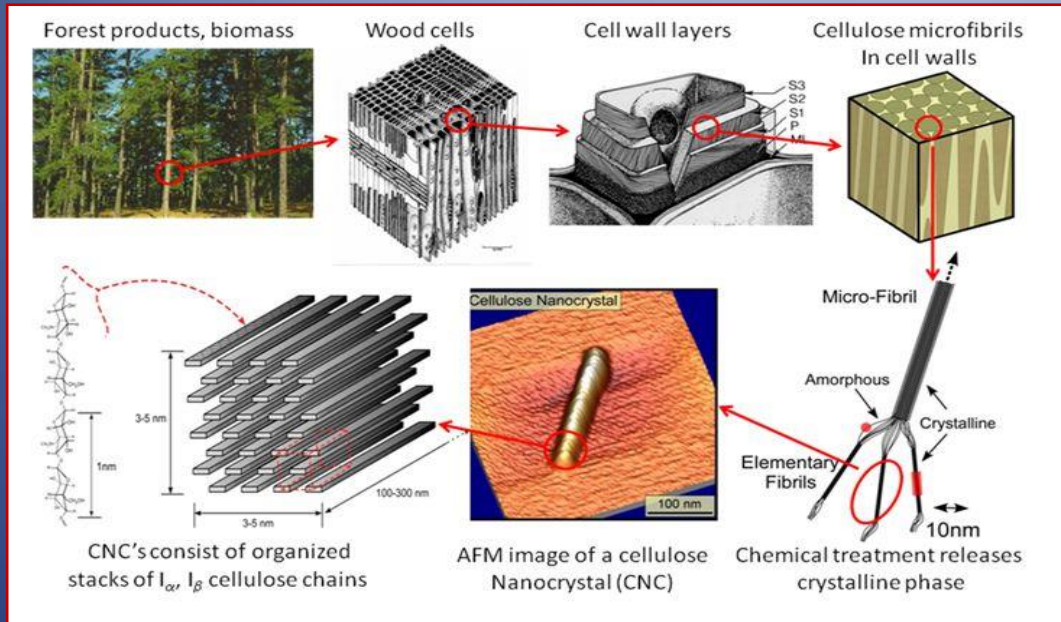
Opportunity: Cellulosic Nanomaterials (CNC)

✓ Stronger

✓ Lighter

✓ Cheaper

✓ Renewable



Wood pellets

\$155 (100% conversion)

Fuel Ethanol

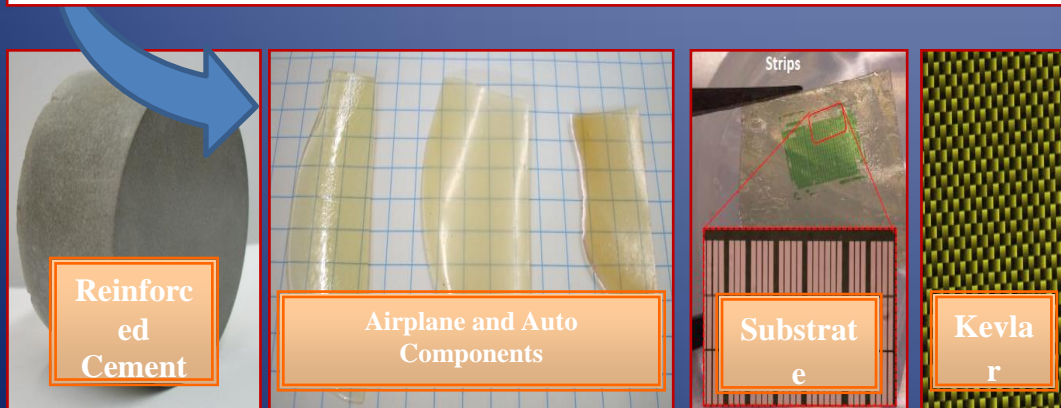
\$255 (@100 gallons/ton)

High Brightness Paper

\$500 (\$1,000/ton - 45% yield)

Cellulose Nanocrystals

\$1,350 (\$6,000/ton - 22.5% yield)



Strategy for a Sustainable Economy =

- ✓ WORKFORCE & TRAINING
- ✓ SUPPLIER NETWORKS
- ✓ ACCESS TO CAPITAL
- ✓ INFRASTRUCTURE
- ✓ BUY / PROCURE LOCAL
- ✓ TRADE / NEW MARKETS
- ✓ RESEARCH AND INNOVATION
- ✓ OPERATIONAL IMPROVEMENTS

SYNERGY

Synergia (Greek): creation of a whole greater than the simple sum of its parts.

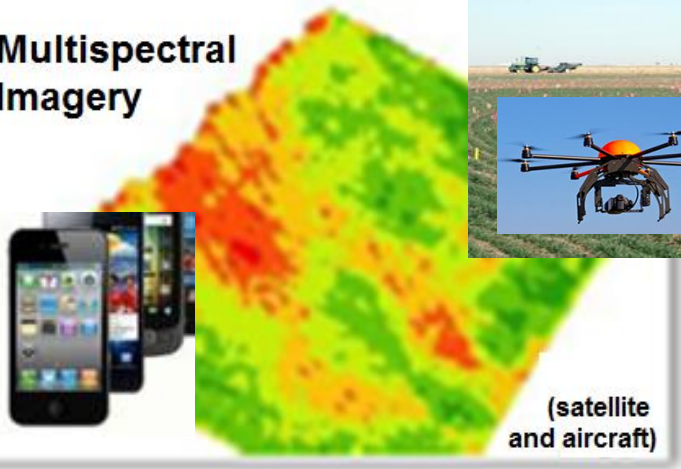
Synergos (Greek): "working together".



Triple Bottom Line:
PEOPLE ~ PLANET ~ PROSPERITY

Sustainable Food, Fiber & Natural Resources Need Fresh Technologies

Multispectral Imagery



Ag Drones

Wireless Soil Sensors

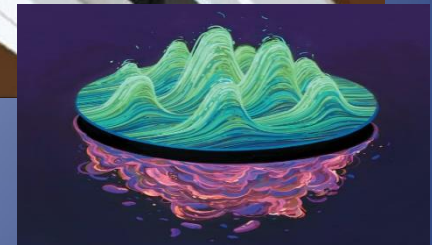


Test kit detects foodborne pathogens

By Jenni Spinner, 09-Jul-2013



Food Safety



Variable Rate Irrigation



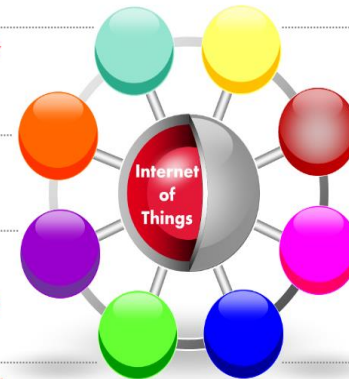
Precision Applications

A dynamic global network infrastructure

with self configuring capabilities

based on standard and interoperable communication protocols

where physical and virtual "things"



have identities, physical attributes, and virtual personalities

use intelligent interfaces,

and are seamlessly integrated

into the information network.

Apps for Ag

A Series of Agricultural Hackathons

April 17 – 19: West Hills College Coalinga hosts a competitive hackathon designed to partner young farmers with mobile application developers from

The event kicks off with Young Farmers & Ranchers from California Farm Bureau Federation informing invited developers of business needs. Coder teams spend weekend creating apps and judges render verdicts Sunday night.

Organized by the California AgTech Roundtable, formed in 2013 to create jobs in rural California through ag technology.



Rural
Development

Committed to the future of rural communities

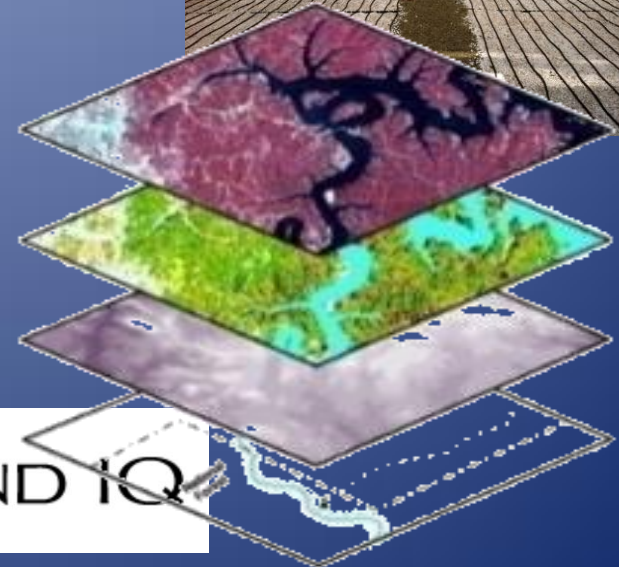
How It Works



Average Water Use Decreased by 10%

Average Production Increased by 10%

Water Savings 5 Times More Per \$ Invested Than Changing From Flood to Drip Irrigation



Soil and Tc
Inform

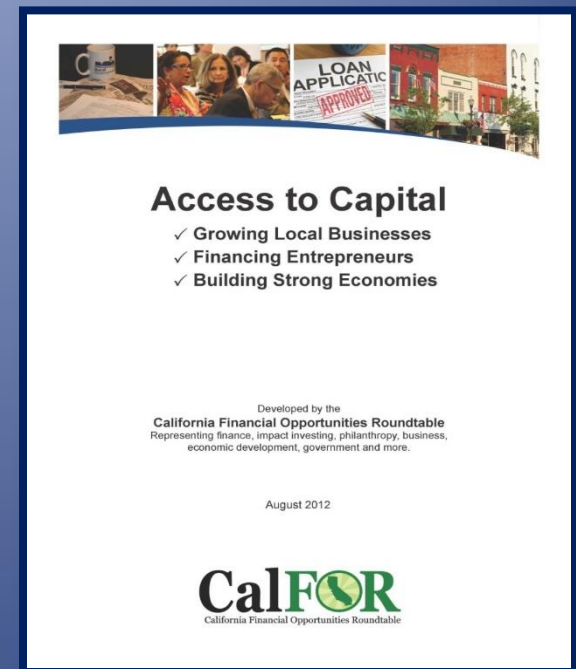


LAND IQ

Equity capital invested in rural areas is just as successful as in tech-oriented metro regions.

A study of 18,000 investments found no statistical difference between rural and metro regions measuring key variables: jobs created, type of industry, length of venture, exit, or performance.

Patricia Scruggs et al, "The Role of Equity Capital in Rural Communities," 2010



www.rurdev.usda.gov/Reports/CA-CalFOR.pdf

Potential New Funding Streams

- ✓ **California Organized Investment Network (COIN)** can fund a wide array of infrastructure.
- ✓ Counties, cities, special districts, or joint powers authorities can utilize **tax increment financing** for rainwater harvesting & small water storage projects.
- ✓ **AB 32 cap-and-trade funds** where storage or retention projects deliver climate benefits, such as through reductions in energy use.
- ✓ **Expanded Infrastructure Financing Districts (EIFD)**.

Potential New Funding Streams

A proposal in President Obama's State of the Union: **Qualified Public Infrastructure Bonds** (QPIB) would expand existing financing tools that allow state and local governments to issue tax-exempt bonds to pay for public infrastructure projects.

If approved by Congress, the QPIB program would expand these tax advantages to financing for airports, ports, mass transit, **solid waste disposal, sewer, and water**, and more.

Tax exempt bonds allows the government issuer to pay back investors at a lower interest rate. Also, the new bonds would also have no expiration date and no limit to how many a government can issue each year.



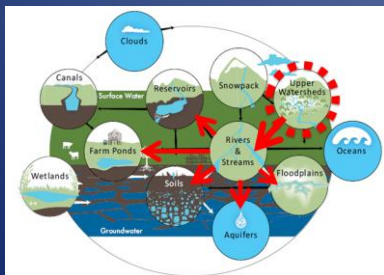
“Layers” of Funding & Economic Activity Will be Needed



Value of Biobased Products will help finance forest health activities – probably not enough.



Augment that with:
Cap & Trade Credits



Need to also monetize value of
“reclaimed” water produced
from forest health activities!



**Private
Sector**



Foundations



**Government
Agencies**

**Economic
Development
Corporations**



Prosperity

People



**Financial
Institutions**

Planet

**Community Colleges
& Job
Training**



**Coop Extension
& Research Institutions**

NGOs



Rural
Development

Committed to the future of rural communities